What is claimed is:

1. A broadband phase shifter, comprising:

a first path network including a reference standard transmission line whose input/output characteristic impedance is Z_0 and electrical length is θ_1;

a second path network having two symmetrical main transmission lines connected to each other by a coupled line in the center and parallel open and short stubs connected to both ends of the two symmetrical main transmission lines, the main transmission lines having characteristic impedance Z_m and an electrical length θ_m and the parallel open and short stubs having characteristic impedance Z_s and an electrical length θ_s; and

a switching means for selecting only one path among the first path network and the second path network.

2. The broadband phase shifter as recited in claim 1, wherein the coupled line is of a single structure.

3. The broadband phase shifter as recited in claim 1, wherein the coupled line is of a double parallel structure.

4. The broadband phase shifter as recited in claim 1, wherein the reference standard transmission line of the first

path network has an input/output characteristic impedance Z_0 and an electrical length θ_1, the Z_0 and θ_1 values being controllable according to a desired phase shift.

5. The broadband phase shifter as recited in claim 1, wherein the electrical length θ_1 of the reference standard transmission line of the first path network has a value obtained by adding an additional electrical length to a basic phase shift designed at the center frequency f_0 of an operating frequency band to acquire the desired phase shift.

6. The broadband phase shifter as recited in claim 1, wherein equivalent impedances Z_{me} and Z_{mo} for an even mode and an odd mode, the electrical length θ_c, and the coupling characteristics R of the coupled line of the second path network have a relationship expressed by:

$$Z_{me} = \sqrt{R} Z_m$$

$$Z_{mo} = Z_m / \sqrt{R}$$

$$\theta_c = \tan^{-1}\left(\sqrt{R \left\{ \frac{1-\cos(180^\circ - 2\theta_m)}{1+\cos(180^\circ - 2\theta_m)} \right\}} \right)$$

where $R = Z_{me} / Z_{mo}$.

7. The broadband phase shifter as recited in claim 1, wherein the electrical length of the main transmission lines and the coupled line of the second path network is 180° at the center frequency.

8. The broadband phase shifter as recited in claim 1, wherein the electrical length of the parallel open and short stubs of the second path network is 45° at the center frequency.

9. The broadband phase shifter as recited in claim 1, wherein the phase slope based on the frequency of the second path network is determined by controlling the electrical length θ_m of the main transmission lines, characteristic impedance Z_m of the main transmission lines, characteristic impedance Z_s of the parallel stubs, and the coupling characteristic R of the coupled line.

10. The broadband phase shifter as recited in claim 1, wherein the switching means selects only one path among the first path network and the second path network through toggle switching between a pair of a first diode and a second diode connected to the first path network and a pair of a third diode and a fourth diode connected to the second path network.

11. The broadband phase shifter as recited in claim 5, wherein the basic phase shift designed at the center frequency f_0 of the operating frequency band is 180°.

12. The broadband phase shifter as recited in claim 1, wherein the characteristic impedance of the main transmission lines of the second path network is increased non-linearly as the electrical length of the main transmission lines of the second path network is increased, and

the characteristic impedance of the open and short stubs of the second path network is decreased non-linearly as the electrical length of the main transmission lines of the second path network is increased.

13. The broadband phase shifter as recited in claim 1, wherein the characteristic impedance of the main transmission lines of the second path network is decreased non-linearly as the coupling characteristic of the coupled line of the second path network is increased, and

the characteristic impedance of the open and short stubs of the second path network is increased non-linearly as the coupling characteristic of the coupled line of the second path network is increased.